We claim:

1. A method for identifying herbicidally active substances, wherein:

a) the expression or the activity of the gene product of a nucleic acid or a gene encompassing:

aa) a nucleic acid sequence with the sequence shown in SEQ ID NO: 1, SEQ ID NO: 3, SEQ ID NO: 5, SEQ ID NO: 7, SEQ ID NO: 9, SEQ ID NO: 11, SEQ ID NO: 13, SEQ ID NO: 15, SEQ ID NO: 17, SEQ ID NO: 19, oder SEQ ID NO: 21, SEQ ID NO: 23, SEQ ID NO: 25, SEQ ID NO: 27, SEQ ID NO: 29, SEQ ID NO: 31, SEQ ID NO: 33, SEQ ID NO: 35, SEQ ID NO: 37, SEQ ID NO: 39, SEQ ID NO: 41, SEQ ID NO: 43, SEQ ID NO: 45, SEQ ID NO: 47, SEQ ID NO: 49 or SEQ ID NO: 51;

bb) a nucleic acid sequence which can be derived from the amino acid sequences shown in SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 18, SEQ ID NO: 20, oder SEQ ID NO: 22, SEQ ID NO: 24, SEQ ID NO: 26, SEQ ID NO: 28, SEQ ID NO: 30, SEQ ID NO: 32, SEQ ID NO: 34, SEQ ID NO: 36, SEQ ID NO: 38, SEQ ID NO: 40, SEQ ID NO: 42, SEQ ID NO: 44, SEQ ID NO: 46, SEQ ID NO: 48, SEQ ID NO: 50 or SEQ ID NO: 52 by backtranslation owing to the degeneracy of the genetic code;

cc) a nucleic acid sequence which is a derivative or a fragment of the nucleic acid sequences shown in SEQ ID NO: 1, SEQ ID NO: 3, SEQ ID NO: 5, SEQ ID NO: 7, SEQ ID NO: 9, SEQ ID NO: 11, SEQ ID NO: 13, SEQ ID NO: 15, SEQ ID NO: 17, SEQ ID NO: 19, oder SEQ ID NO: 21, SEQ ID NO: 23, SEQ ID NO: 25, SEQ ID NO: 27, SEQ ID NO: 29, SEQ ID NO: 31, SEQ ID NO: 33, SEQ ID NO: 35, SEQ ID NO: 37, SEQ ID NO: 39, SEQ ID NO: 41, SEQ ID NO: 43, SEQ ID NO: 45, SEQ ID NO: 47, SEQ ID NO: 49 or SEQ ID NO: 51 and which has at least 60% homology at the nucleic acid level;

dd) a nucleic acid sequence which encodes derivatives or fragments of the polypeptides with the amino acid sequences shown in SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 18,

SEQ ID NO: 20, oder SEQ ID NO: 22, SEQ ID NO: 24, SEQ ID NO: 26, SEQ ID NO: 28, SEQ ID NO: 30, SEQ ID NO: 32, SEQ ID NO: 34, SEQ ID NO: 36, SEQ ID NO: 38, SEQ ID NO: 40, SEQ ID NO: 42, SEQ ID NO: 44, SEQ ID NO: 46, SEQ ID NO: 48, SEQ ID NO: 50 or SEQ ID NO: 52 and which have at least 50% homology at the amino acid level;

ee) a nucleic acid sequence which encodes a fragment or an epitope of a polypeptide which binds specifically to an antibody, the antibody specifically binding to a polypeptide which is encoded by the sequence shown in SEQ ID NO: 1, SEQ ID NO: 3, SEQ ID NO: 5, SEQ ID NO: 7, SEQ ID NO: 9, SEQ ID NO: 11, SEQ ID NO: 13, SEQ ID NO: 15, SEQ ID NO: 17, SEQ ID NO: 19, oder SEQ ID NO: 21, SEQ ID NO: 23, SEQ ID NO: 25, SEQ ID NO: 27, SEQ ID NO: 29, SEQ ID NO: 31, SEQ ID NO: 33, SEQ ID NO: 35, SEQ ID NO: 37, SEQ ID NO: 39, SEQ ID NO: 41, SEQ ID NO: 43, SEQ ID NO: 45, SEQ ID NO: 47, SEQ ID NO: 49 or SEQ ID NO: 51;

ff) a nucleic acid sequence which encodes a fragment of a nucleic acid shown in aa) and which has a translation releasing factor activity, a cobalamin synthase activity, an arginyl-tRNA synthase activity, an RNA helicase activity, a GTP binding protein activity, a pseudouridylate synthase activity, an adenylate kinase activity, a preprotein translocase secA precursor protein activity, a DCL protein activity, an arginine-tRNA ligase activity, a plastidial glutathione reductase activity, a transcription factor sigma activity, a calmodulin activity, an INT6 activity, a helicase YGL150c activity, an RNA-binding activity, a heat shock transcription factor activity, a chloroplastidial DNA nucleoid binding activity or a Met2-type cytosin DNA methyltransferase activity; and/or

gg) a nucleic acid sequence which encodes derivatives of the polypeptides with the amino acid sequences shown in SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 18, SEQ ID NO: 20, oder SEQ ID NO: 22, SEQ ID NO: 24, SEQ ID NO: 26, SEQ ID NO: 28, SEQ ID NO: 30, SEQ ID NO: 32, SEQ ID NO: 34, SEQ ID NO: 36, SEQ ID NO: 38, SEQ ID NO: 40, SEQ ID NO: 42, SEQ ID NO: 44, SEQ ID NO: 46, SEQ ID NO: 48, SEQ ID NO: 50 or

SEQ ID NO: 52 and which has at least 20% homology at the amino acid level and has an equivalent biological activity;

or

b) the expression or activity of an amino acid sequence which is encoded by a nucleic acid sequence of aa) to gg),

is influenced and such substances which reduce or block the expression or the activity are selected.

2. A method as claimed in claim 1, wherein the expression or the activity of the nucleic acid or the protein is reduced or blocked by reducing or blocking the

a) transcription,
b) translation,
c) processing and/or
d) modification

of the nucleic acid sequence or amino acid sequence in claim 1.

3. A method as claimed in claim 1 or 2, wherein the activity of the nucleic acid or of the protein is reduced or blocked by a low-molecular-weight substance.

4. A method as claimed in any of claims 1 to 3, wherein the identification of the substances is carried out in a high-throughput screening (HTS).

5. A method as claimed in one of claims 1 to 4, wherein the selected substances are applied to a plant in order to test the herbicidal activity of the substances and the substances which show herbicidal activity are selected.

6. A method as claimed in one of claims 1 to 5, wherein the method is carried out in an organism.

7. A method as claimed in one of claims 1 to 6, wherein bacteria, yeasts, fungi or plants are used as the organism.

8. A method as claimed in one of claims 1 to 7, wherein an organism is used which is a conditional or natural mutant of one of the sequences described in claim 1.

9. A nucleic acid construct comprising a nucleic acid sequence as shown in claim 1, wherein the nucleic acid sequence is linked to one or more regulatory signals.

10. A substance identified by a method as claimed in one of claims 1 to 8, the substance having a molecular weight of less than 1000 daltons and more than 50 daltons and a Ki value of less than 10^{-7} M.

11. A substance identified by a method as claimed in one of claims 1 to 8, the substance being a proteinogenic substance or an antisense RNA.

12. A substance as claimed in claim 11, the substance being an antibody against the protein encoded by one of the sequences shown in claim 9.

13. A nucleic acid construct as claimed in claim 9, the nucleic acid construct additionally comprising further nucleic acid sequences.

14. A vector comprising a nucleic acid construct as claimed in claim 9 or 13.

15. An organism comprising at least one nucleic acid construct as claimed in claim 9 or 13 or at least one vector as claimed in claim 14.

16. An organism as claimed in claim 15, the organism being a plant, a microorganism or a nonhuman animal.

17. A transgenic plant comprising a functional or nonfunctional nucleic acid construct as claimed in claim 9 or 13 or a vector as claimed in claim 14.

18. The use of a nucleic acid construct as claimed in claim 9 or 13 or of a vector as claimed in claim 14 for the generation of transgenic plants.

19. A method of identifying an antagonist of proteins which are encoded by a nucleic acid sequence as claimed in claim 9 or 13 by following through the following method steps

i) contacting cells which express the protein, or the protein, with a candidate substance;

ii) testing the biological activity of the protein;

iii) comparing the biological activity of the protein with a standard activity in the absence of the candidate substance, a reduced biological activity of the protein indicating that the candidate substance is an antagonist.

20. A method as claimed in claim 19, wherein the antagonist identified in accordance with claim 19, letter iii), is applied to a plant to test its herbicidal activity, and those antagonists which show a herbicidal activity are selected.

21. A method of controlling undesired vegetation, which comprises allowing a herbicidally active amount of a substance identified by a method as claimed in any of claims 1 to 8 or of an antagonist identified by a method as claimed in claim 19 or 20 to act on plants and/or their environment.

22. The use of a substance identified by a method as claimed in any of claims 1 to 8 or of an antagonist identified by a method as claimed in claim 19 or 20 as herbicide or for regulating the growth of plants.

23. A method for generating modified gene-products encoded by the nucleic acid sequences SEQ ID NO: 1, SEQ ID NO: 3, SEQ ID NO: 5, SEQ ID NO: 7, SEQ ID NO: 9, SEQ ID NO: 11, SEQ ID NO: 13, SEQ ID NO: 15, SEQ ID NO: 17, SEQ ID NO: 19, oder SEQ ID NO: 21, SEQ ID NO: 23, SEQ ID NO: 25, SEQ ID NO: 27, SEQ ID NO: 29, SEQ ID NO: 31, SEQ ID NO: 33, SEQ ID NO: 35, SEQ ID NO: 37, SEQ ID NO: 39, SEQ ID NO: 41, SEQ ID NO: 43, SEQ ID NO: 45, SEQ ID NO: 47, SEQ ID NO: 49 or SEQ ID NO: 51, their derivates or fragments as claimed in claim 1, which comprises the following method steps:

a) expression of the proteins encoded by SEQ ID NO: 1, SEQ ID NO: 3, SEQ ID NO: 5, SEQ ID NO: 7, SEQ ID NO: 9, SEQ ID NO: 11, SEQ ID NO: 13, SEQ ID NO: 15, SEQ ID NO: 17, SEQ ID NO: 19, oder SEQ ID NO: 21, SEQ ID NO: 23, SEQ ID NO: 25, SEQ ID NO: 27, SEQ ID NO: 29, SEQ ID NO: 31, SEQ ID NO: 33, SEQ ID NO: 35, SEQ ID NO: 37, SEQ ID NO: 39, SEQ ID NO: 41, SEQ ID NO: 43, SEQ ID NO: 45, SEQ ID NO: 47, SEQ ID NO: 49 or SEQ ID NO: 51, their derivatives or fragments as claimed in claim 1 in a heterologous system or in a cell-free system

b) randomized or directed mutagenesis of the protein by modification of the nucleic acid,

c) measuring the interaction of the modified gene product with the herbicide or the biological activity of the modified gene product in the presence of the herbicide,

d) identification of derivatives of the protein which exhibit a lesser degree of interaction or whose activity is less affected,

e) testing the biological activity of the protein following application of the herbicide,

f) selection of the nucleic acid sequences which, or whose gene products, show a modified biological activity with regard to the herbicide.

24. A method as claimed in claim 23, wherein the sequences selected in accordance with claim 23 f) are introduced into an organism.

25. A method for generating transgenic plants which are resistant to substances found by a method as claimed in any of claims 1 to 8 or a method as claimed in claim 19 or 20, which comprises overexpressing, in these plants, nucleic acids with the sequences as described in claim 1.

26. An organism generated by a method as claimed in claim 23 or 24 or a method as claimed in claim 25.

27. A composition comprising a herbicidally active amount of at least one substance identified by a method as claimed in any of claims 1 to 8 or of an antagonist identified by a method as claimed in claim 19 or 20 and at least one inert liquid and/or solid carrier and, if appropriate, at least one surface-active substance.

28. A composition comprising a growth-regulating amount of at least one substance identified by a method as claimed in any of claims 1 to 8 or of an antagonist identified by a method as claimed in claim 19 or 20 and at least one inert liquid and/or solid carrier and, if appropriate, at least one surface-active substance.

29. A composition comprising the substance as claimed in any of claims 10 to 12 or an antagonist as claimed in claim 19.

30. A kit encompassing the nucleic acid construct as claimed in claim 9 or 13, the substancce as claimed in any of claims 10 to 12, an antagonist identified as claimed in claim 19 or 20, and the composition as claimed in claim 29.